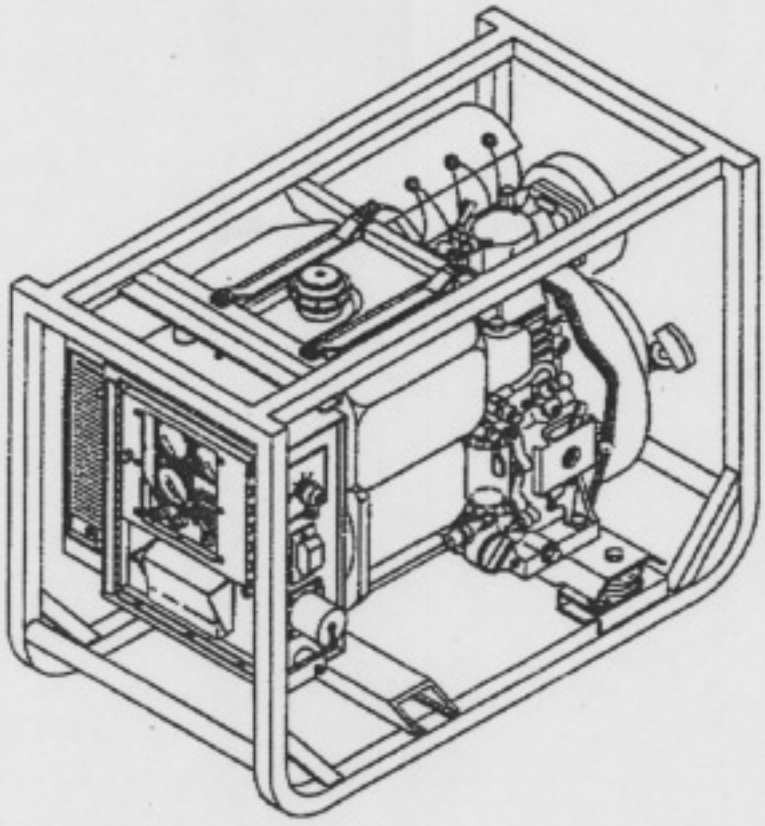
SUPPLEMENTARY MBU TRAINING MATERIAL
OPERATOR COURSE FOR
THE 2 kW MILITARY TACTICAL GENERATOR SET
MEP-531A-120 VAC, 60 HZ

STUDENT GUIDE



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Prepared for
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STUDENT NAME PAGE
Student Guide

Name_____

Class No. _____

WARNING SUMMARY

WARNING

High Voltage is produced when this generator set is in operation. Use care when working around an open control panel with the generator set operating. Improper operation and/or failure to follow this warning could result in personal injury or death by electrocution.

WARNING

Never attempt to start the generator set if it is not properly grounded. Failure to observe this warning could result in serious injury or death by electrocution.

WARNING

Never attempt to connect or disconnect load cables while the generator is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

WARNING

DC voltages are present at generator set electrical components even with generator set shutdown. Avoid grounding self when touching any electrical components. Failure to observe this warning can result in personal injury.

WARNING

The fuels in this generator set are flammable. Do not smoke or use open flame when performing maintenance. Flames and explosion could result in severe personal injury or death.

WARNING

Hot fueling of generators while they are operating presents a safety hazard and should not be attempted. Hot engine surfaces and sparks produced from the engine and generator circuitry are possible sources of ignition. Failure to observe this warning could result in severe personal injury or death.

WARNING

Exhaust discharge contains deadly gases. Do not operate generator set in enclosed area unless exhaust discharge is properly vented outside. Position as far away from personnel, shelters, and occupied vehicles as possible. Failure to observe this warning could result in severe personal injury or death due to carbon monoxide poisoning.

WARNING

Liquids under pressure are generated as a result of operation of the generator set. High-pressure leaks could cause severe personal injury or death.

WARNING

Avoid contacting metal items with bare skin in extreme cold weather. Failure to observe this warning can result in personal injury.

WARNING

Remove metal jewelry when working on electrical system/components. Failure to observe this warning could cause severe personnel injury from electric shock.

WARNING

The noise level of this generator set when operating could cause hearing damage. Hearing protective devices must be worn when operating or working within 13 feet of the generator set when it is running. Failure to observe this warning can result in personal injury.

WARNING

Most cleaning solvents are flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Good general ventilation is normally adequate.

WARNING

When using compressed air, wear protective glasses and use clean, low-pressure air, 30 psi (206.8 kPa) maximum. Failure to follow these instructions could result in eye injury.

WARNING

When changing/draining oil, use chemical splash goggles to protect eyes.

WARNING

Proper Personal Protection Equipment (PPE) must be used in accordance with OSHA Regulation 29 CFR 1926.62 to protect employees from adverse health hazards of lead or lead dust in the air while sanding CARC paint. Consult your local Safety Office before working on CARC painted surfaces.

WARNING

Adhesive is flammable and toxic. Vapors may ignite explosively. Avoid breathing in vapors. Provide adequate ventilation to prevent vapor concentrations in excess of permissible exposure levels. Keep away from heat, sparks, and open flame. Do not smoke. Extinguish all flames and turn off non-explosion-proof electrical equipment during use until vapors are dissipated. Close container tightly after use. Contains Methylethylketone. Avoid swallowing.

WARNING

Since the N (neutral) for MEP-531A and - (ground) for MEP-501A load terminal is grounded to the frame and ground stud on the generator set, ensure that the neutrals are connected in the distribution system.

WARNING

Be aware, the lock retaining clips could make contact with the load terminal board cover with the potential for electrical shock.

WARNING

When servicing the fuel tank, use a container or cloth to catch the excess fuel to prevent spilling over engine components. Be sure to properly dispose of diesel fuel and diesel fuel soaked cloth.

FOR FIRST AID REFER TO FM 21-11

TABLE OF CONTENTS

HOW TO USE THIS SUPPLEMENTARY MBU TRAINING MATERIAL STUDENT GUIDE

This Student guide has been prepared to follow the course of instruction and has space for you to take notes on the information presented. It is arranged in accordance with the topics taught, and is in sequence with those topics. Upon return to your command, it is recommended that you retain this Student Guide for future reference.

GENERATOR SET DESCRIPTION

A. Equipment Characteristics, Capabilities, and Features.

1. General.

B. Location and Description of Major Components.

1. Diesel Engine.

2. Alternator.

3. Control Panel Assembly.

4. Fuel Tank.

5. Skid Base.

6. Safety Devices.

DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATIORS

A. Controls and Indicators.

1. Recoil Starter.

2. Air Intake Cover.

3. Decompression Lever.

4. Run Lever.

5. Stop Lever.

6. Fuel Shutoff Valve.

7. Fuel Filter Bleed Screw.

8. Oil Fill Cap/Dipstick.

9. START-PREHEAT/PREHEAT/OFF/START Switch.

10. ON-OFF Load Circuit Breaker.

11. NATO Slave Receptacle.

12. VOLTS Meter.

13. % LOAD Meter.

14. HOUR Meter.

15. Voltage Adjust Potentiometer.

16. GFCI Receptacle.

17. Fuse.

18. HERTZ Frequency Meter.

19. Load Terminals.

20. Ground Stud.

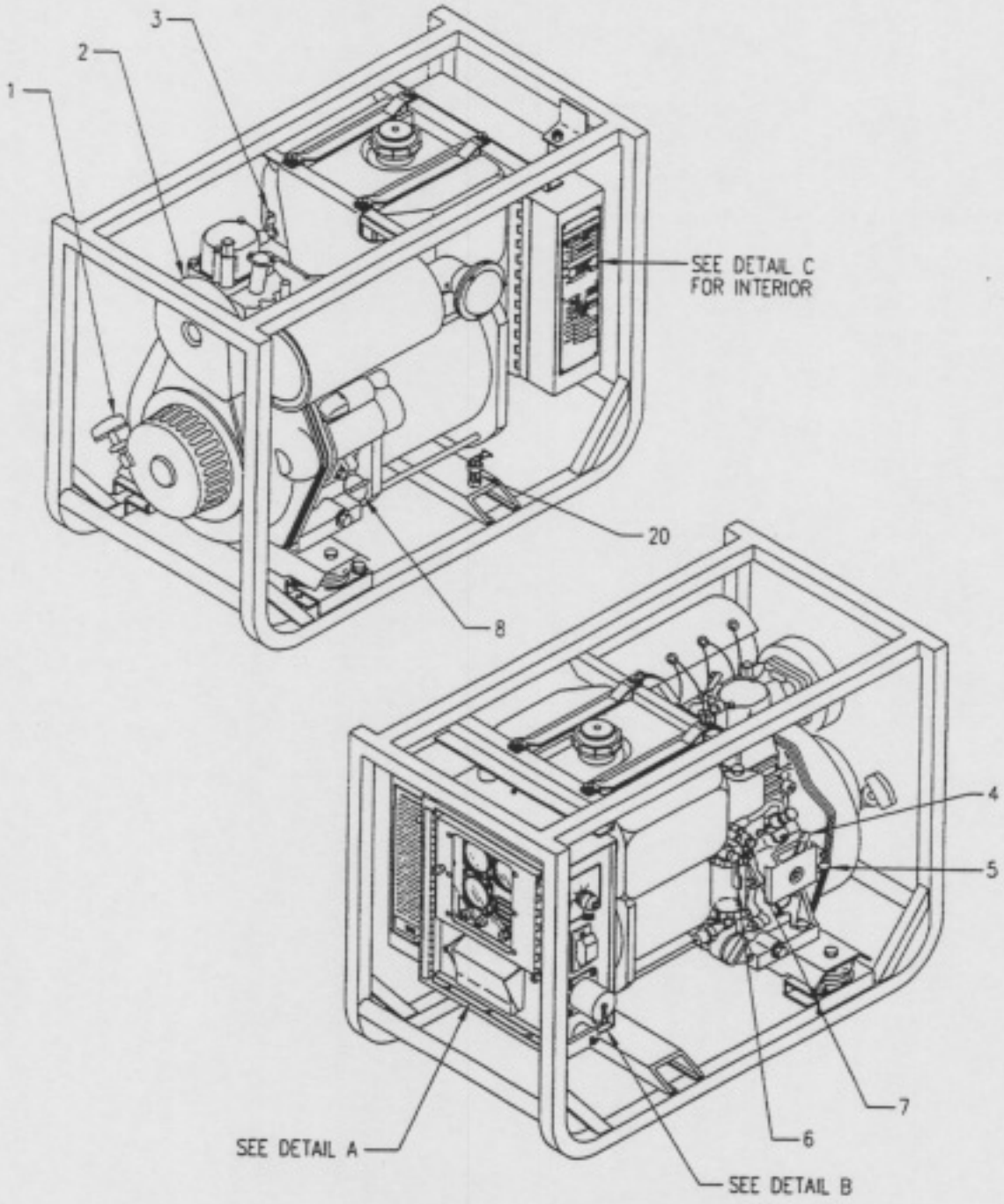
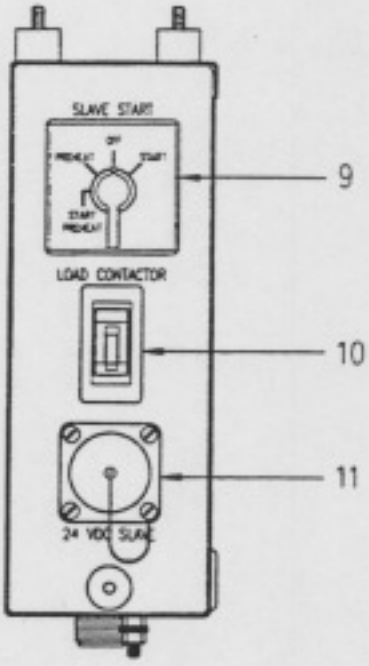
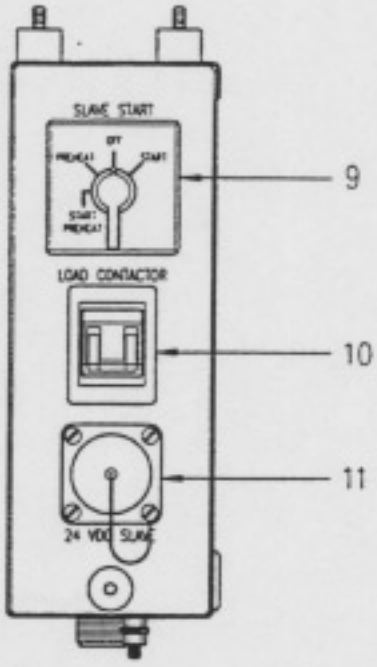


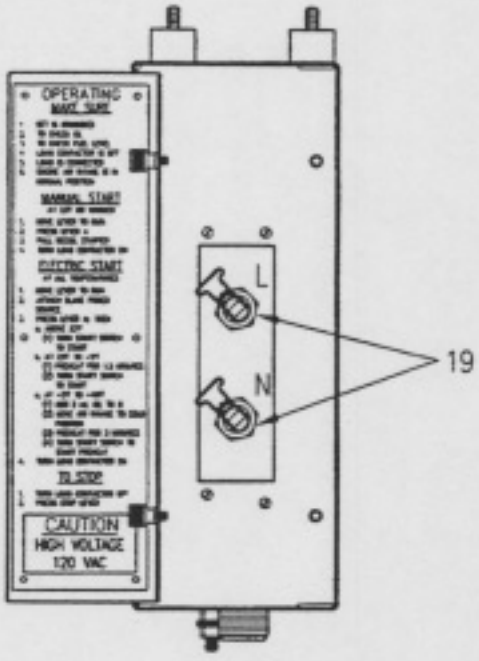
Figure 1-1. Controls and Indicators (Sheet 1 of 3)

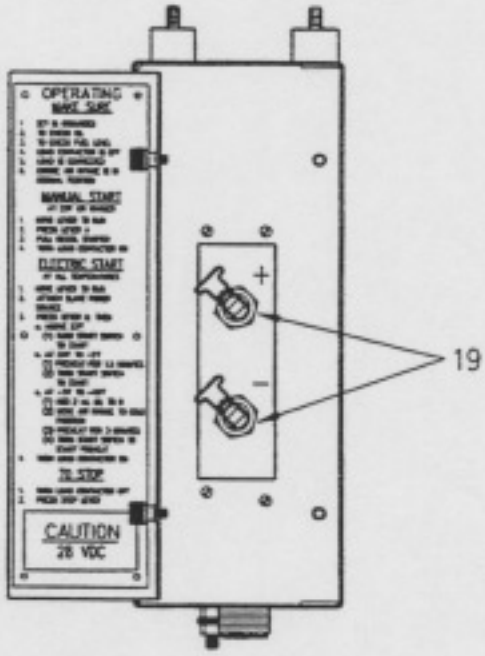


DETAIL B
MEP-531A



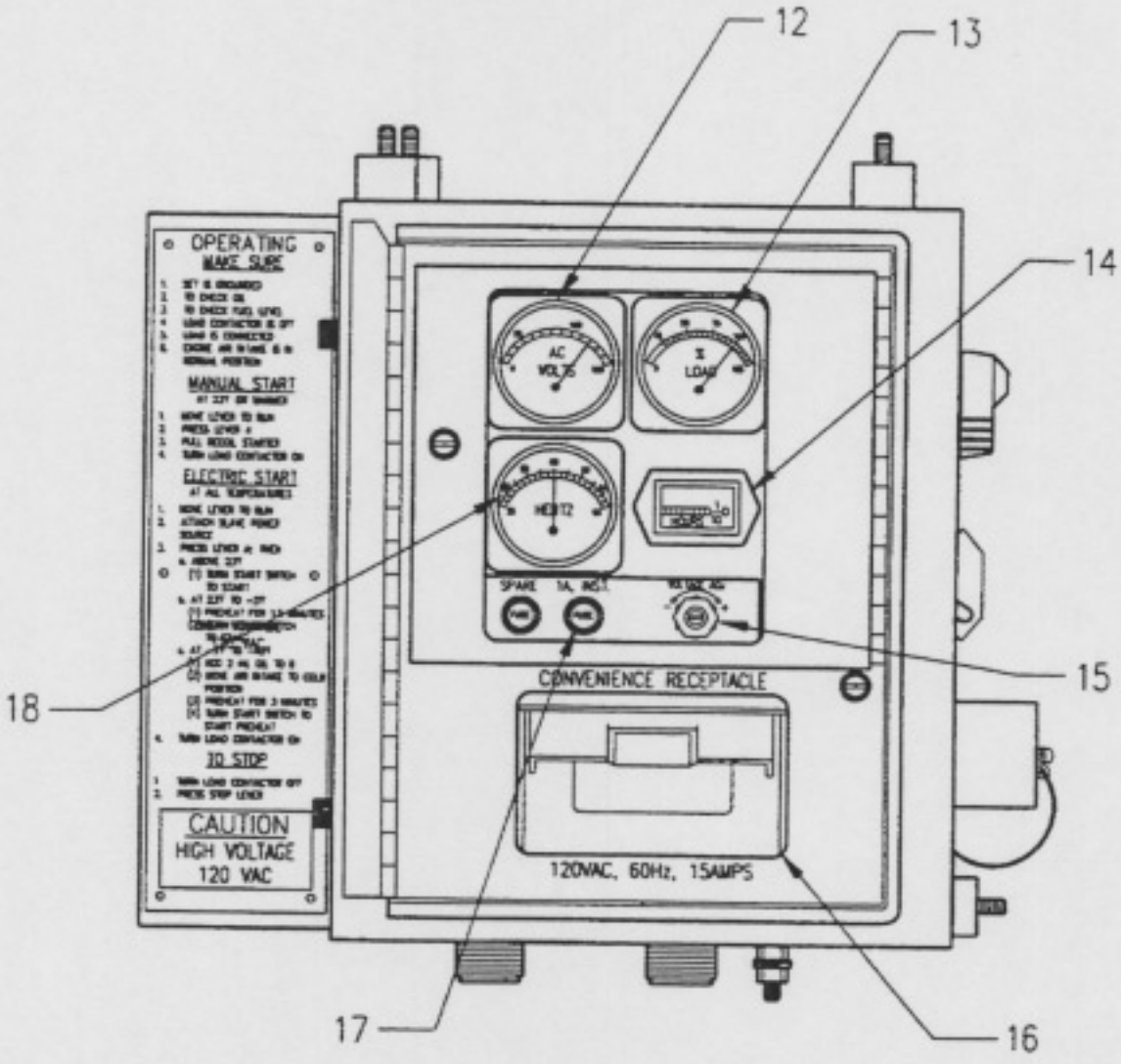
DETAIL B
MEP-501A





DETAILS B/C

Figure 1-1. Controls and Indicators (Sheet 2 of 3)



DETAIL A

Figure 1-1. Controls and Indicators (Sheet 3 of 3)

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

A. General.

Preventive Maintenance Checks and Services (PMCS) are those scheduled procedures, which are essential to the efficient operation of the equipment. PMCS prevent possible damage that might occur through neglect or failure to observe warning symptoms on time. Ensure all noted discrepancies are corrected.

B. Description of Columns.

1. Item Number.

2. Interval.

3. Item To Be Inspected.

4. Procedure.

5. Equipment Is Not Ready/Available If.

C. Preventive Maintenance Procedures.

1. Before.

2. During.

3. After.

OPERATION UNDER USUAL/UNUSUAL CONDITIONS

A. Assembly and Preparation for Use (Grounding, Load Cable, Priming).

B. Initial Adjustments and Checks.

C. Operating Procedures.

OPERATOR MAINTENANCE INSTRUCTIONS

A. Lubrication Instructions.

Lubrication is not required by the operator (crankcase oil is).

B. Troubleshooting.

Troubleshooting tables list common malfunctions that an Operator may find with the 2kW. Perform tests, inspections, and corrective actions in the order they appear in the table. The Troubleshooting tables cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify higher maintenance.

C. Operator Maintenance Procedures.

1. Fuse.

Appendix A

Leading Particulars

Refer to TM 9-6115-673-13&P page 1-8 for Leading Particulars.

Appendix B

Preventive Maintenance Checks and Services (PMCS) tables

NOTE

Within designated intervals, these checks are to be performed in the order listed.

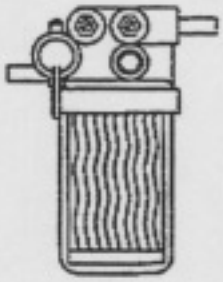
B-Before operation D-During operation A-After operation

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
				GENERATOR SET		
(1)	•			Control Panel	Check ON-OFF load circuit breaker for damage. 	ON-OFF load circuit breaker damaged.
	•		•	Instrument Panel	Check window protecting instrument panel for damage.	
	•		•		Check all indicators and controls for damage and missing parts.	Indicators or controls damaged or missing.
		•			Check all indicators for proper operation.	VOLTS meter or HERTZ frequency meter (MEP-531A) inoperative.
(2)	•		•	Identification and Instruction Plates	Check all identification and instruction plates for damage, security, and legibility.	Safety or operation instruction decal missing or illegible.

Operator Preventive Maintenance Checks and Services

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(3)	•			Load Terminals	Inspect load terminals for damage and security. 	Load terminals damaged or loose. Retaining clips missing or damaged.
(4)	•	•		Ground terminal stud	Inspect ground terminal stud for damage. Ensure generator set is properly grounded. 	Generator set ground terminal stud is damaged or generator set not properly grounded. Retaining clip missing or damaged.

Operator Preventive Maintenance Checks and Services

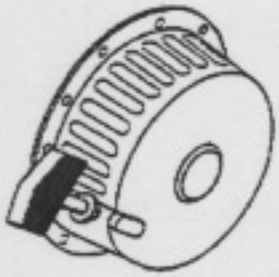
(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(5)	•			Air Intake Cover Wing Nut	Check air intake cover wing nut for security. Tighten if necessary. 	Air intake cover cannot be secured.
(6)	•		•	Filter Assembly, Fuel	Inspect fuel filter assembly for damage and security. Check fuel filter bowl for water or other contaminants. 	Fuel bowl contains water or contaminants.

Operator Preventive Maintenance Checks and Services

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(7)	•	•	•	Fuel System	Inspect fuel system for loose or missing fuel line clamps, damaged fuel lines, and leaking/damaged fuel tank. Check for evidence of fuel leaks.	Any fuel leaks, or damaged, loose, or missing parts.
	•	•	•		Check fuel level and if necessary, service fuel tank to red line on fuel strainer. Ensure fuel tank fill neck strainer is not clogged or damaged. The following fuels may be used between -51 and 122°F (-46 and 50°C): (a) DL-1 (A-A-52557) [-26° to 0°F (-32 to -18°C)] (b) DL-2 (A-A-52557) [0° to 122°F (-18 to 50°C)] (c) JP-8 (MIL-T-83133) [-26°F to -51°F (-32°C to -46°C)]	

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
				DIESEL ENGINE		
(8)	•		•	Crankcase Oil	Ensure generator set is level and check diesel engine lubricating oil level using oil fill cap/dipstick (do not screw in oil fill cap/dipstick when checking oil level). Refer to Figure , item 8 for the locations of oil fill cap/dipstick. Add oil if required for the following operating environments: MIL-L-46167, OW30 (-40° to 0°F (-40° to -18°C)) MIL-L-2104, 15W40 (0° to 120°F (-18° to 49°C)) 	
	•	•	•		Inspect the diesel engine and surrounding area for oil leaks.	Class III oil leaks.

Operator Preventive Maintenance Checks and Services

(1) Item No.	(2) Interval B	D	A	(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
(9)	•	•	•	Cylinder head cooling fins and recoil starter cover.	Inspect cooling fins and air intake slots in recoil starter cover for damage and debris restricting air flow over and through cooling fins. Remove debris. Check recoil starter assembly for damage and operation. 	Any damaged, loose, or missing parts.

Appendix C

Operation Under Usual/Unusual Conditions

OPERATION UNDER USUAL/UNUSUAL CONDITIONS

C.1 General.

This section provides information and guidance for generator set operation under normal conditions, refer to FM 20-31.

C.2 Assembly and Preparation for Use.

a. Installation of Ground Rods.

WARNING

Do not operate the generator set until it has been connected to a suitable ground. Serious injury or death can result from operating an ungrounded generator set.

1. Inset the ground cable (6 AWG min.) through the slot on the frame mounted terminal stud GND. Hold terminal body hex with one wrench and tighten terminal nut on the terminal stud.

2. Drive an eight foot (or longer) ground rod into the ground until the clamp on top of the ground rod is just above the surface.

3. Insert the ground cable through the ground rod clamp and tighten the clamp screw.

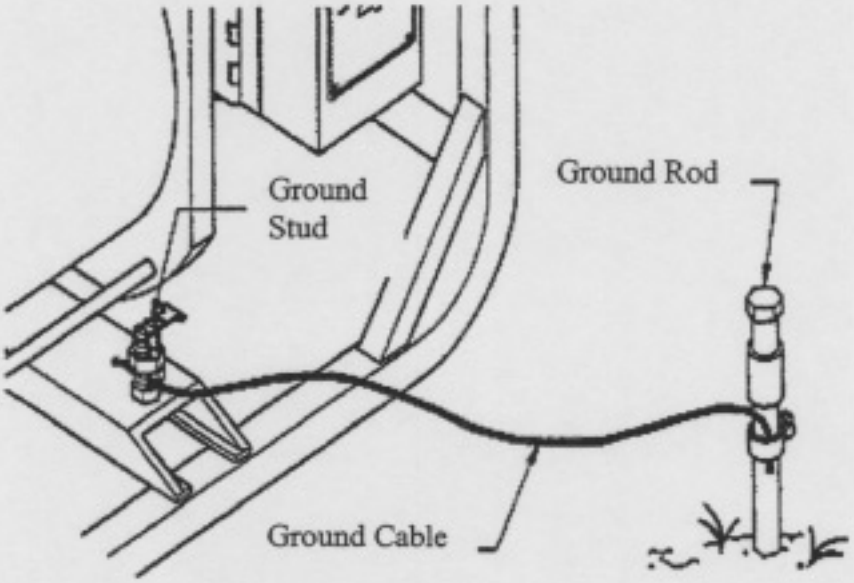


Figure C-1. Grounding Connections (Typical Installation)

b. Installation of Load Cables.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

1. If operating, shut down the generator set and open load terminal board cover.

2. Using suitable wrenches, hold the terminal body hex with one wrench and loosen the terminal nuts (Figure C-2) on terminals "L" and "N".

3. Insert ends of load cables through the load cable exit. Then insert ends of cables in the slots of the load terminal studs.

4. Hold terminal body hex with one wrench and tighten load terminal nuts and lock the retaining clips. Then close and secure the load terminal board cover.

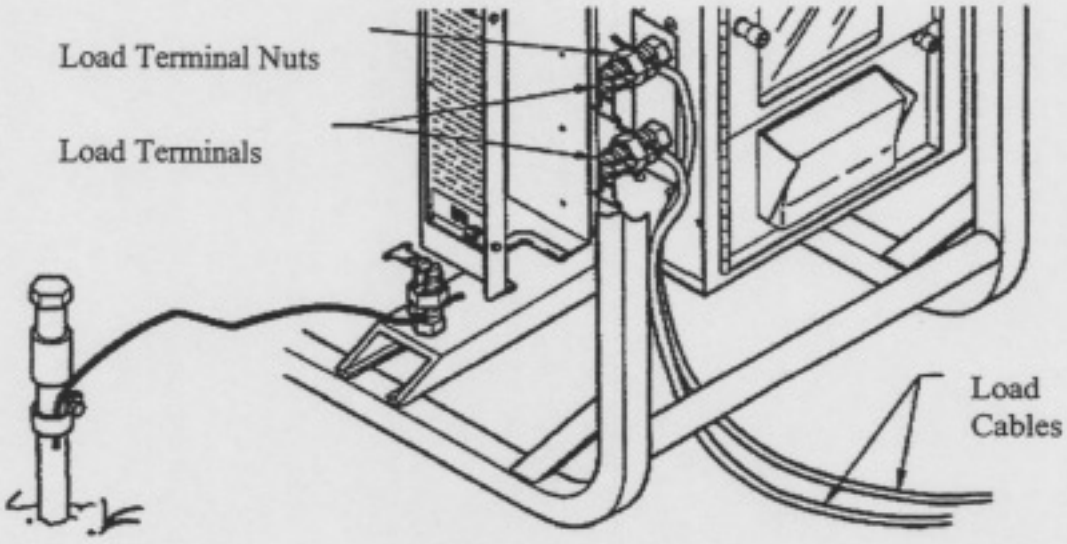


Figure C-2. Installation of Load Cables

c. Priming and Bleeding the Fuel System.

Under normal conditions, the fuel system does not require priming. Certain conditions may allow air into the fuel system, for example, running out of fuel. Once this occurs, the air must be bled before the engine will start or run smoothly. Using Figure C-3 proceed as follows:

WARNING

The fuels in this generator set are flammable. Use care when servicing or draining the fuel tank. Do not service or drain the fuel tank while open flames are present.

Use a container or cloth to catch the excess fuel to prevent spilling over engine components. Be sure to properly dispose of diesel fuel and diesel fuel soaked cloth.

1. Check that fuel tank has fuel and that fuel shutoff valve (Figure C-3) located on the filter is positioned to the open position.

2. Open the two bleed screws (Figure C-3) at the top of the filter in the order listed below.

    a. Open left bleed screw to bleed air from tank to filter fuel line.

    b. Open right bleed screw to bleed air from filter to pump fuel line. It may be necessary to squeeze the line by hand to force air out of bleed screw.

3. When fuel flows freely and evenly out of bleed screw (without air bubbles), tighten both bleed screws.

4. Loosen output fuel line fitting at fuel injection pump, place engine RUN lever to RUN position, depress and hold decompression lever, and pull recoil starter rope until fuel flows from around the fuel line fitting (without air bubbles). Tighten output fuel line.

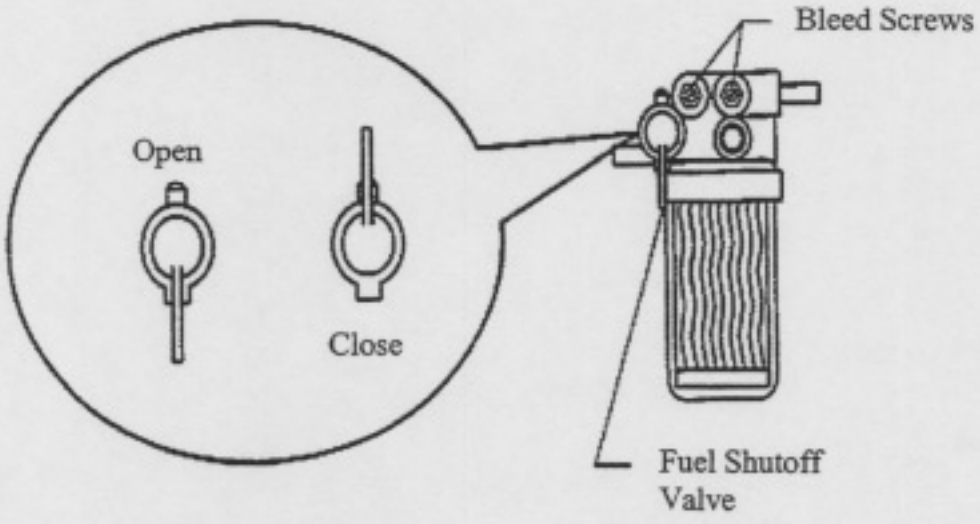


Figure C-3. Fuel Filter Bleed Screws

C.3 Initial Adjustments and Checks.

The diesel engine must be broken-in, avoiding heavy loads (no greater than 75%), for a period of at least twenty hours to ensure proper operation of the generator set. After the initial, break-in period, intake and exhaust valve clearances must be checked and adjusted, the head nuts torque must be checked, and engine lubricating oil changed. Contact unit maintenance.

C.4 Operating Procedures.

WARNING

High Voltage is produced when this generator set is in operation. Use care when working around an open control panel with the generator set operating. Improper operation and/or failure to follow this warning could result in personal injury or death by electrocution.

WARNING

Exhaust discharge contains deadly gases. Do not operate generator set in enclosed area unless exhaust discharge is properly vented outside. Position as far away from personnel, shelters, and occupied vehicles as possible. Failure to observe this warning could result in severe personal injury or death due to carbon monoxide poisoning.

WARNING

The noise level of this generator set when operating could cause hearing damage. Hearing protective devices must be worn when operating or working within 13 feet of the generator set when it is running. Failure to observe this warning can result in personal injury.

CAUTION

If the diesel engine starts racing (overspeeding) at startup or during operation, there is a governor control malfunction. Depress the engine STOP lever immediately to avoid possible damage to the diesel engine caused by excessive overspeeding.

NOTE

Under normal operating conditions, the generator set will vibrate and "walk" on hard surfaces. Block the generator set appropriately.

a. Manual Starting (23 to 122 degrees).

WARNING

Do not operate the generator set until it has been connected to a suitable ground. Serious injury or death can result from operating an ungrounded generator set.

1. Ground generator set, refer to paragraph C.2a.

2. Switch ON-OFF load circuit breaker (10, Figure 1-1) to OFF.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

3. Connect the load cables to the load terminals, refer to paragraph C.2b.

4. Perform all B (Before) PMCS procedures, refer to Appendix B.

5. Check that the air intake cover (2) is in the Normal operating (summer) position as indicated on tip of filter cover (Figure C-4).

6. Turn fuel shutoff valve (6, Figure 1-1) to the open position.

7. Pull the recoil starter (1) slowly. Stop when it feels tight.

8. Depress decompression lever "A" (3).

9. Move engine RUN lever (4) to RUN position (Figure C-5).

CAUTION

A condition known as reverse rotation can occur if the recoil starter rope (1, Figure 1-1) is pulled out too slowly. If the engine rotation reverses, you will hear abnormal noises caused by the reverse rotation of the oil pump. DEPRESS THE ENGINE STOP LEVER IMMEDIATELY. Failure to do so will cause the engine bearings to seize due to lack of lubrication.

10. Take up the slack in the recoil starter rope (1) and pull the rope quickly and all the way out.

11. If the engine fails to start, repeat steps 7 thru 10.

12. If the engine still fails to start after two attempts, refer to operator troubleshooting tables in Appendix D.

13. Check all gauges for proper indication as follows, refer to Figure 1-1:

NOTE

If any gauge indicates an improper value, refer to the operator troubleshooting tables in Appendix D.

a. Volts AC meter (12), 120 VAC.

b. Hertz frequency meter (8), 60 – 63 Hz.

c. % Load meter (13), under no load 0%. The reading will vary as the demand changes (from 0 to 125%).

NOTE

Under normal conditions, allow the diesel engine to warm-up for five minutes before applying a load. If necessary, the load can be applied immediately.

14. Switch ON-OFF load circuit breaker (10, Figure 1-1) to ON to apply load.

15. Perform all D (During) PMCS procedures in accordance with Appendix B.

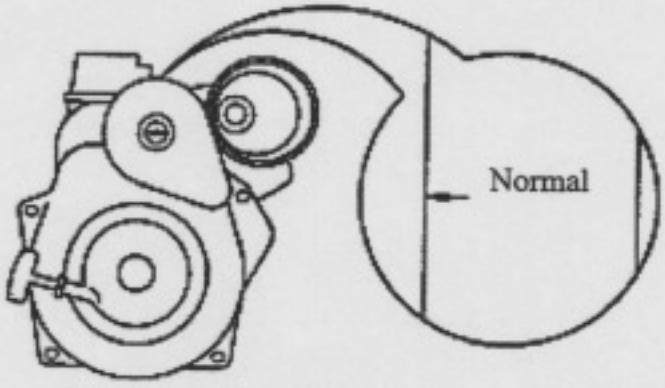


Figure C-4. Air Intake Cover, Normal Operation

b. Electric Starting (23 to 122 degrees).

1. Ground generator set, refer to paragraph C-2a.

2. Switch ON-OFF load circuit breaker (10, Figure 1-1) to OFF.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

3. Connect load cables to the load terminals, refer to paragraph C-2b.

4. Perform all B (Before) PMCS procedures, refer to Appendix B.

5. Check that the air intake cover is in the Normal operating (summer) position as indicated on the top of the filter cover (Figure C-4).

6. Turn fuel shutoff valve (6, Figure 1-1) to the open position.

CAUTION

Do not crank engine more than 10 seconds without allowing the starter to cool for at least 15 seconds between starts. Over cranking can damage the starter.

7. Connect a 24 VDC battery source to the NATO slave receptacle (11).

8. Move the engine RUN lever (4) to the RUN position (Figure C-5).

9. Turn START-PREHEAT/PREHEAT/OFF/START switch (9, Figure 1-1) to clockwise to START position. Release switch when engine starts.

10. If diesel fails to start, repeat steps 8 and 9.

11. If engine still fails to start after two attempts, refer to the operator troubleshooting tables in Appendix D.

12. Disconnect 24 VDC battery source from NATO slave receptacle (11).

13. Check all gauges for proper indication as follows:

NOTE

If any gauge indicates an improper value, refer to the operator troubleshooting tables in Appendix D.

a. Volts AC meter (12), 120 VAC.

b. Hertz frequency meter (18), 60 – 63 Hz.

c. % Load meter (13), under no load 0%. The reading will vary as the demand changes (from 0 to 125%).

NOTE

Under normal conditions, allow the diesel engine to warm-up for five minutes before applying a load. If necessary, the load can be applied immediately.

14. Switch ON-OFF load circuit breaker (10, Figure 1-1) to ON to apply the load.

15. Perform all D (During) PMCS procedures in accordance with Appendix B.

c. Electric Starting (23 to –5 degrees).

1. Ground generator set, refer to paragraph C-2a.

2. Switch ON-OFF load circuit breaker (10, Figure 1-1) to OFF.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

3. Connect load cables to the load terminals, refer to paragraph C-2b.

4. Perform all B (Before) PMCS procedures, refer to Appendix B.

5. Turn fuel shutoff valve (6, Figure 1-1) to the open position.

6. Connect a 24 VDC battery source to the NATO slave receptacle (11).

7. Move the engine RUN (4) lever to the RUN position (Figure C-5).

8. Turn START-PREHEAT/PREHEAT/OFF/START switch (9, Figure 1-1) counterclockwise to PREHEAT position for 1-1/2 minutes.

CAUTION

Do not crank engine more than 10 seconds without allowing the starter to cool for at least 15 seconds between starts. Over cranking can damage the starter.

9. Turn START-PREHEAT/PREHEAT/OFF/START switch (9, Figure 1-1) to clockwise to START position. Release switch when engine starts.

10. If diesel fails to start, repeat steps 8 and 9.

11. If engine still fails to start after two attempts, refer to the operator troubleshooting tables in Appendix D.

12. Disconnect 24 VDC battery source from NATO slave receptacle (11).

13. Check all gauges for proper indications as follows:

NOTE

If any gauge indicates an improper value, refer to the operator troubleshooting tables in Appendix D.

a. Volts AC meter (12) , 120 VAC.

b. Hertz frequency meter (18), 60 – 63 Hz.

c. % Load meter (13), under no load 0%. The reading will vary as the demand changes (from 0 to 125%).

NOTE

Under normal conditions, allow the diesel engine to warm-up for five minutes before applying a load. If necessary, the load can be applied immediately.

14. Switch ON-OFF load circuit breaker (10, Figure 1-1) to ON to apply the load.

15. Perform all D (During) PMCS procedures in accordance with Appendix B.

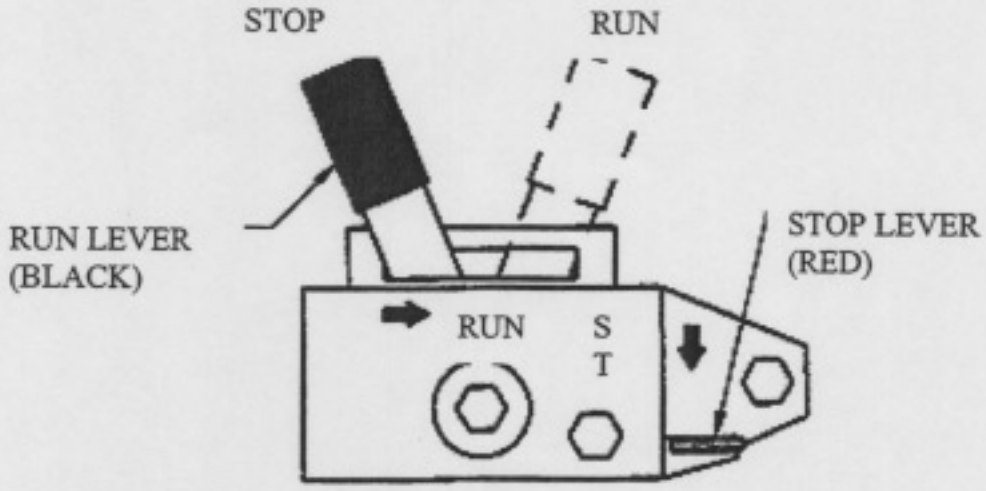


Figure C-5. Engine RUN and STOP Controls

d. Electric Starting (-5 degrees and below).

1. Ground generator set, refer to paragraph C-2a.

2. Switch ON-OFF load circuit breaker (10, Figure 1-1) to OFF.

WARNING

Never attempt to connect or disconnect load cables while the generator set is running. Failure to observe this warning could result in severe personal injury or death by electrocution.

3. Connect load cables to the load terminals, refer to paragraph C-2b.

4. Perform all B (Before) PMCS procedures, refer to Appendix B.

5. Turn fuel shutoff valve (6, Figure 1-1) to the open position.

6. Connect a 24 VDC battery source to the NATO slave receptacle (11).

7. Move the engine RUN lever (4) to the RUN position (Figure C-5).

8. Turn air intake cover (2, Figure 1-1) to COLD position, refer to Figure C-6.

9. Turn START-PREHEAT/PREHEAT/OFF/START switch (9, Figure 1-1) counterclockwise to PREHEAT position for 3 minutes

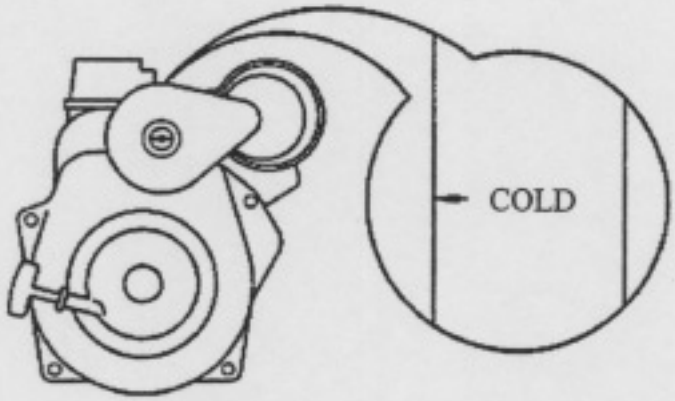


Figure C-6. Air Intake Cover, Cold Operation

CAUTION

Be sure to install the rubber plug (Figure C-7) in the cylinder head cover opening after adding oil. Leaving the hole unplugged can lead to premature diesel engine failure as water, dirt, and debris entering the hole can damage internal parts. Do not add more than the specified amount of engine oil through the cylinder head cover.

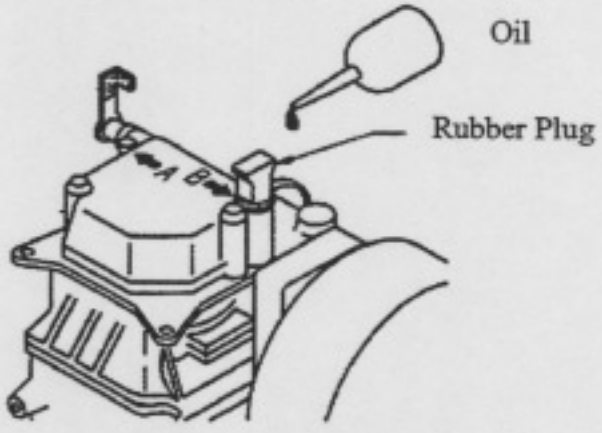


Figure C-7. Adding Oil – Cylinder Head Cover Opening

10. Remover rubber Plug "B" (Figure C-7) in cylinder head cover and add 2ml of clean engine oil, MIL-L-2104, 15W40. Install rubber plug.

CAUTION

Do not crank engine more than 10 seconds without allowing the starter to cool for at least 15 seconds between starts. Over cranking can damage the starter.

11. Turn START-PREHEAT/PREHEAT/OFF/START switch (9, Figure 1-1) to counterclockwise to START-PREHEAT position. Release switch when engine starts.

12. If diesel fails to start, repeat steps 9 and 11.

13. Disconnect 24 VDC battery source from NATO slave receptacle (11).

14. Check all gauges for proper indication as follows:

NOTE

If any gauge indicates an improper value, refer to the operator troubleshooting tables in Appendix D.

a. Volts AC meter (12), 120 VAC.

b. Hertz frequency meter (18), 60 – 63 Hz.

c. % Load meter (13), under no load 0%. The reading will vary as the demand changes (from 0 to 125%).

NOTE

Under normal conditions, allow the diesel engine to warm-up for five minutes before applying a load. If necessary, the load can be applied immediately.

15. Switch ON-OFF load circuit breaker (10, Figure 1-1) to ON to apply the load.

16. Perform all D (During) PMCS procedures in accordance with Appendix B.

e. Stopping Procedure.

1. Switch ON-OFF load circuit breaker (10, Figure 1-1) to OFF position and allow engine to run approximately 3 minutes with no load.

2. Press engine STOP lever (5).

3. Turn fuel shutoff valve (6) to the closed position.

4. Perform all A (After) PMCS procedures in accordance with Appendix B.

C.5 Identification and Instruction Plates.

There are identification and instruction plates on the generator set. Use TM 9-6115-673-13&P, Figure 2-9 for the location and contents of each plate on the generator set.

C.6 Preparation for Movement.

a. Shut down generator set. Refer to paragraph C.4e.

b. Disconnect load cables (Figure C-2).

c. Disconnect ground cable (Figure C-1) and remove ground rods.

d. Secure all generator set access doors and panels.

e. For initial set up after movement, refer to paragraph C.2 for assembly and preparation for use.

C.7 Extreme Environmental Conditions.

a. Operation in Extreme Cold (23 to –51 degrees).

The generator is designed for use in ambient temperatures as low as –51 degrees. To ensure satisfactory operation, the following steps should be taken.

1. When possible, provide shelter from winds, freezing rain, and drifting snow. Position generator set behind a wind barrier.

2. When operated in an enclosed area, be sure that proper provisions are made for removal of exhaust gases.

CAUTION

Be careful not to scrape, scratch, gouge, or in any way damage the generator set. Avoid moving wiring as much as possible.

3. Remove accumulated snow or ice, if possible, by moving the generator set to a heated enclosure and allow the accumulation to melt after first wiping or brushing away loose deposits. When a heated enclosure is not available, remove snow or ice by wiping, brushing, or carefully picking the deposits away.

4. For extreme cold weather conditions, MIL-L- 46167, 0W30 oil is recommended.

WARNING

Avoid contacting metal items with bare skin in extreme cold weather. Failure to observe this warning can result in personal injury.

5. Keep fuel tank at least ¾ full during cold weather operations.

b. Operation in Extreme Heat (Above 120 degrees).

1. When operating in extremely hot temperatures, attempt to place the generator set in a shaded area.

2. Provide as much ventilation as possible.

3. Keep all engine air passages and end cover openings clean and free of obstructions.

4. Make sure that the air intake cover (12, Figure 1-1) is turned so that ambient air is directed to the air intake, see Figure C-4.

5. Do not completely fill the fuel tank. Leave one inch for fuel expansion.

6. Use MIL-L-2104 GR OE/HDO-30 lubricating oil in the diesel engine crankcase.

c. Operation in Dusty or Sandy Areas.

1. Shield generator set from dust and sand.

2. Clean dust and dirt from the generator set as required. Do not allow dust to accumulate around the generator set.

3. Inspect and clean secondary (outer) air intake filter.

4. Keep generator air inlet and outlet slots clean.

5. Carefully remove dust and sand from control panel.

6. Keep area around fuel tank clean and free from dust and sand.

d. Operation in Rainy or Humid Conditions.

1. When not in use, cover generator set with canvas or other waterproof material. Remove cover during dry periods to allow unit to dry out.

2. Keep fuel tank full to prevent condensation.

e. Operation in Salt Water Areas.

CAUTION

Salt water is harmful to paint and is particularly corrosive when allowed to remain in contact with exposed metal.

1. Cover generator set with canvas or other material when it is not in use.

2. Wipe generator set down frequently with fresh water and allow it to dry thoroughly.

f. Operation at High Altitudes.

NOTE

The generator set is designed to produce 2kW continuous at elevations up to 4000 feet above sea level, 95 degrees ambient and 30 to 70% relative humidity without special service or adjustment.

g. Derating Generator Set Output for High Altitudes and Temperatures.

1. To run the set at a higher altitude, derate output 1.3% for every 328 feet.

2. Provide adequate ventilation as the engine is more likely to overheat at high altitudes.

3. When operating in high temperatures, derate 3% for every 50 degrees above 95 degrees (Refer to Table C-1).

Table C-1. Altitude and Temperature Derating Calculation

$$\text{Altitude Deration} = \frac{\text{Altitude} - 4000 \text{ feet} \times (0.013) \times (2000\text{W})}{328 \text{ feet}}$$

$$\text{Temperature Deration} = \frac{\text{Temperature} - 95 \text{ degrees} \times (0.03) \times (2000\text{W})}{50 \text{ degrees}}$$

$$\text{Total Deration} = 2000\text{W} - \text{Altitude Deration} - \text{Temperature Deration}$$

C.8 Nuclear, Biological, and Chemical Decontamination Procedures.

a. The generator set is capable of being operated by personnel wearing nuclear, biological, or chemical (NBC) protective clothing without special tools or support equipment. Refer to FM 3-5, NBC Decontamination for information on decontamination procedures. Specific procedures for the generator set are the following.

b. Control panel indicators sealing gaskets, control panel door gaskets, access door gaskets, rubber tubing, coverings for electrical conduits, and retaining cord for slave receptacle cover will absorb and retain chemical agents. Replacement of these items is the recommended method of decontamination.

c. Lubricants and fuel may be present on the external surfaces of the generator set or components due to leaks or normal operation. These fluids will absorb NBC agents. The preferred method of decontamination is removal of these fluids using conventional decontamination methods in accordance with FM 3-5.

d. Continued decontamination of external generator set surfaces with supertropical bleach (STB) and decontaminating solution number 2 (DS2) will degrade clear plastic indicator coverings to a point where reading the indicators will be come impossible. This problem will become more evident for soldiers wearing protective masks. The use of STB and DS2 decontaminants in these areas should be minimized. Indicators should be decontaminated with warm, soapy water.

e. External surfaces of the control panel assembly that are marked with painted or stamped lettering will not withstand repeated decontamination with STB or DS2 without degradation of this lettering. The recommended method of decontamination for these areas is warm, soapy water.

f. Areas that will entrap contaminants, making efficient decontamination extremely difficult, include the following: space behind knobs and switches on the control panel, exposed heads of screw, areas adjacent to and behind exposed wiring conduits, hinged areas of access doors, spaces behind externally mounted equipment data plates, retaining cords for external receptacle covers, areas behind GFCI receptacle cover, access panel locking mechanisms, fuel cap, load output terminal board access door, NATO slave receptacle, frequency adjustment controls, areas around tie-down /lifting points, crevices around access doors, and external screens covering ventilation areas. Replacement of these items, if available, is the preferred method decontamination. Conventional decontamination methods should be used on these areas, while stressing the importance of thoroughness and the probability of some degree of continuing contact and vapor hazard.

g. The use of overhead shelters, or chemical protective covers is recommended as an additional means of protection against contamination in accordance with FM 3-5. If using covers, care should be taken to provide adequate space for airflow and exhaust.

h. For additional NBC information, refer to FM 3-3 and 3-4.

Appendix D

Troubleshooting/Operator Maintenance Procedures

D.1 Operator Troubleshooting Procedures.

a. Purpose of Logic Tree Table.

Troubleshooting Tables list common malfunctions that you may find with your equipment. Perform the tests, inspections, and corrective actions in the order they appear in the table. The troubleshooting tables cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your supervisor.

NOTE

Before you use these procedures, be sure that all PMCS procedures have been performed.

b. Symptom Index.

Diesel Engine Will Not Start (Manual Starting)
Diesel Engine Will Not Start (Electric Starting)
Diesel Engine Runs Rough
Voltage Output Drops
Generator Set Vibrating/Bouncing Excessively
No Voltage Indication on Volts Meter (M2)
Voltage Indication on Volts Meter (M2) is
High, Low, or Fluctuating
No Indication on %Load Meter (M1) with Load Applied
No Indication on Hertz Frequency Meter (M4)
Hours Meter (M3) Not Operating
Excessive Voltage Drop when Applying Load

D.2 Instrument Fuse.

a. Removal.

1. Shut down generator set.

2. Release instrument cover by turning fastener, open instrument cover.

3. Remove cap and fuse (Figure D-1).

b. Inspection.

1. Inspect fuse (Figure D-1) for cracks and burned out element. Discard fuse if defective. If necessary, remove spare fuse from spare fuse holder.

NOTE

If there is no fuse in the spare fuse holder, contact maintenance for the proper replacement.

2. Inspect contacts in cap and fuse holder for evidence of corrosion and damage. If corroded or damaged, contact Unit maintenance for repair.

c. Installation.

1. Insert fuse into fuse holder and install cap (Figure D-1).

2. Close and secure instrument cover.

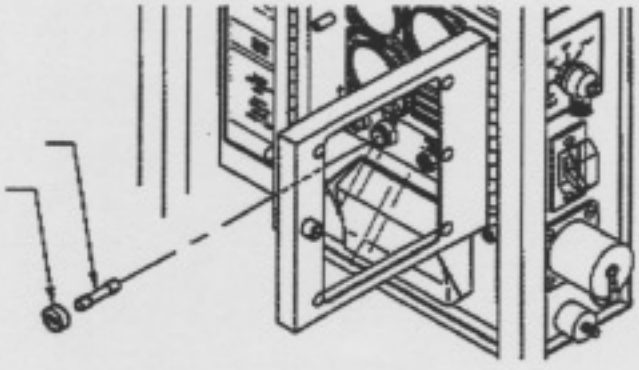


Figure D-1. Fuse (F1) Replacement Cap

Appendix E

References

TM 9-6115-673-13&P	2kW Military Tactical Generator Set
FM 21-11	First Aid for Soldiers
FM 20-31	Electric Power Generation in the Field